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ston, carpenter, 7 Red Lion Street, Wapping; J. R. Hickman, Whitechapel; W. Illingworth, house and ship-joiner, Great Hermitage Street, Wapping; J. Brodie, Wapping; and Mr. Stevens, of the firm of Messrs. Grissell and Peto.

No. IX.

IMPROVED RULING MACHINE FOR ENGRAVERS.

The GOLD ISIS MEDAL *was presented to Mr. F.* WARNER, *Spann's Building, St. Pancras, for his improved Ruling Machine for Engravers.*

IN 1841, Mr. Warner received the Society's silver medal for a ruling-machine for the use of engravers, which is described in Vol. LIV. of the Society's Transactions, since which time a more perfect knowledge of what was required to enable the machine to be applied to other branches of the art induced him to turn his attention to the subject, and the result is the machine in its present form.

The moving principle for the division of the lines is that commonly known as Mr. Taylor's (or the lever motion), described in Vol. LI. of the Society's Transactions; and Mr. Warner's improvement consists in the application of that principle to a machine calculated to perform the work with greater precision. In the act of using the machine as hitherto constructed, the person ruling is under the necessity of being at the end instead of behind his work; thus the lines are always in a vertical direction, and, consequently, the power of stopping at any required point exactly, and also of seeing distinctly what he may be doing, becomes very limited: but, notwithstanding these inconveniences, the end position, under the old form of the machine, is the best that could be adopted, inasmuch as it brings his right hand to the clamping screw and keeps him out of the way of the strip, upon the perfect security of which much of the accuracy of width depends. The use of a clamping-screw is, however, objectionable, from a great liability to variation in the pinch required, producing a corresponding variation in the line, and thereby sometimes spoiling a tint of considerable value, besides the constant care required to ensure the clamping at the right time, a neglect of which will also spoil the tint.

The following are the improvements effected by Mr. Warner's new machine, as illustrated by Plate 3.

1st. In the motion to bring it close to the hand and by the substitution of springs for the clamping screw, thus rendering the pinch perfectly uniform and instantaneous.

2d. By the alteration and form of the ruler-bar and its general arrangements, it being now placed in a horizontal instead of a vertical position, enabling the person ruling to see what he may be doing with the same ease as when using a common parallel ruler, and also giving him a facility of joining the tint (should such be required), not possessed by the ordinary machines.

3d. By the board moving under the ruler-bar, thereby keeping the part to be ruled always at an equal distance from the person ruling, which distance can be made to suit his convenience.

4th. In the power of removing the bar and using the board as an ordinary working board, by means of which any alteration or addition can be made without removing the plate from its position.

5th. The carriage for the diamond point is so constructed that, whether used for waved or straight lines, it is never removed from its ordinary bearing, the motion being obtained by a perpendicular axis attached to the same, and which gives to the point the best possible direction to ensure a waved line of equal breadth throughout.

6th. In using a cylinder for the production of waved lines, upon which are filed dents or hollows, according to the kind of effect required, so that by a slight movement of the tangent-screw all the gradations, from a deep wave to a straight line, can be produced, or from a wave of any kind it may be brought into a dissimilar one to prevent the rowiness attendant on common-waved line-ruling, the present mode being more simple and quicker in its operation than by Mr. Warner's former machine.

7th. Different depths of wave may be obtained from the originals on the cylinder by moving the ruling pin nearer to or farther from the centre.

8th. It constitutes a simple but excellent contrivance for raising and retaining the arm of the carriage, when it is found necessary to use much greater weights than hitherto used for the diamond point, such as for the roulette, &c., by which means it is raised and kept secure until required to be lowered to commence another line.

9th. This method of mounting the roulette enables it to be kept perfectly steady on its axis, so as to ensure by the use of the machine a repetition of lines parallel to each other, a thing almost impossible to accomplish by the old method.

Figs. 1 to 6, and 8, are one-sixth the actual size of the machine, and the others are one-fourth the size. The letters of reference are the same to all the figures. The foundation of the machine is an iron frame cast in one piece, having cross-bars and a wide fin all round the inside to render it sufficiently stiff.

Fig. 1 is a perspective view of the frame alone. The surface of the two sides *a b*, *a b*, are planed quite flat, and their interior sides are perfectly parallel to each other. Fig. 2 is a plan of the frame with part of the superstructure, and fig. 3 a front elevation; *c c* is the sliding plate cast in one, with the four blocks *d d*, and the two fins *e e* under it; the blocks *d d* rise a little above the other parts, so that the work-board *f* may be screwed on them. In order to move quite parallel, the slide, *c c*, is made flat and well fitted to slide on the surface *a b*, *a b*, with an under cross-bar *g*, to slide against the inside of *a b*, on one side, and to keep which in close contact a spring *h* is placed within the opposite or left side *a b*. The sliding plate *c* is moved in equally successive steps, and its fulcrum is made alternately to take exactly the same steps forward; for this purpose a small tablet *i* stands up from the back of the frame, fig. 1; its surface is made level with the surface of the slide *c c*, and the fulcrum strap *j*, figs. 2 and 4, is laid on both, without attachment to either, but during each step of the plate *c*, the fulcrum strap *j* is held on the tablet *i* by a clamping-plate *k*, which is drawn down on it by two springs, as shewn in fig. 5, which is an inside elevation of that part of the frame; then, to release the strap so as to let the fulcrum move, a roller is introduced under the coupling plate *l;* this is mounted on a crank (figs. 4 and 6), from which proceeds a connecting-rod *n* to a lever *o o* (fig. 2), whose fulcrum is at *p*. On pulling this lever by its handle *o*, the crank *m* will raise the clamping-plate *l*, and thereby overcome the force of the spiral springs; the plate *k* will then rise up, as shewn in fig. 5, by the action of two light springs *q q*, which are placed under its ends, thus leaving the fulcrum strap free to move forward, which it will do by means of the spring *s*, fig. 2.

Fig. 4 is a section through the line *a a*, fig. 2.

It will be seen in fig. 1 that the fore and aft crossbar *rr* is placed a little aside the centre; this allows the crank to be central, and in it is fixed the stud on which the crank moves, as at *r*, fig. 6. On letting go the handle *o* (fig. 2), the spiral spring again holds the fulcrum-bar fast with exactly the same force as before, thus securing the most uniform action. The fulcrum-bar, having taken its step, and being held fast, the lever *t* may be moved by pushing the button *u;* the lever is jointed to the fulcrum-bar by one pin, and fits over the adjoining pin *v*, which is fixed in the slide *c*, the moving of the lever will, therefore, have advanced the slide a little forward. The lever *t* is armed with steel to rest against the steel stop *w*, or the regulating screw *x*, by which the distance of the lines is determined. Thus, as often as the fulcrum bar *j* is set free, the spring *s* will advance it, and return the lever to its resting-place against the stop *w*, and, when the fulcrum is fast, the engraver will move the lever forward to the stop-screw *x*, and so advance his work; thus the joint-pin and stud *v* alternately become the fulcrum to let each other step forward, once for every line that is ruled. The lever *t* has near its index end a roller *y* to support and secure its moving freely. The work-board *f*, when screwed on the blocks *d d*, completely covers and protects the moving apparatus, as in the small figure 15, the plate 17 to be ruled is laid on it, and over that stands the bridge or ruler-bar *z z*.

The portions *b b* of the frame are made wider to receive this bridge, which is made with screws at each end to pass down through either of the three pairs of holes, and be secured by screw-nuts, as at *b*, fig. 3, and in the end view, fig. 7.

Fig. 8 is a top view of the bridge or ruler-bar *z*, shewing the V groove, and flat bearing for guiding the carriage; 1 1 the cylinder for waved lines; 2 its tangent screw.

Description of the Carriage.

Fig. 9 is part of the ruler-bar *z* with the carriage on it, to which fig. 7 answers as an end elevation, and figs. 10 to 14 are separate portions; figs. 10 and 11 are elevations of the base of the carriage, fig. 12 top view of a part; the right side 3 stands up vertically to hold the vertical axis 4, the lower part of which is spread out horizontally to 5 5, fig. 13 is a top view of it; this receives the axis 6 of the etching arm 7.

In fig. 14, 8 is the socket to hold the diamond point or the roulette. When the lines are to be straight the ruler-bar *z* is the guide, then the vertical axis 4 is made fast by the screw 9, figs. 9 and 10; but for waved lines the screw 9 is loosened to set free the vertical axis 4 with its arms 5 5, the longest of which is perforated with two holes, into one of which is put a rubbing pin 10, then the spring 11 will keep this rubber in close contact with the waved surface of the cylinder 1 1, and give the same lateral motion to the etching point in the socket 8. The carriage is moved by a central capstan handle 12, which revolves on its screw with friction enough to retain it, which friction it receives from the spring 13 under it; from this handle proceeds a string under and over two pulleys in the arm 14, and down to the ruling arm 7. When the carriage is to return, the handle is made to wind up a little of the string, so as to lift the etching point off the plate, and again unwound for ruling another line. But when the roulette is used, a balance-arm 15 15, fig. 7, raises it for the return or change of place, and retains it by the catch 16.

No. X.

METHOD OF ANATOMICAL MODELLING.

The SILVER ISIS MEDAL was presented to W. F. L. GOMPERTZ, Esq., of No. 20 Maida Vale, Edgeware Road, for his Method of Anatomical Modelling.

MR. GOMPERTZ's method of teaching anatomy, a model illustrative of which is lodged in the Society's Repository, is particularly adapted for its intended purpose, in the absence of dissection, especially in hot climates. All the muscles, veins, arteries, and nerves of the arm are seen, as when the fat and skin, &c. have been removed from the arm. In the model belonging to the Society the basis is the natural skeleton. The muscles are formed of red calico, stuffed to their natural size; the tendons are furnished with hooks, which fasten them down to their various insertions, the veins and arteries of pink and blue calico, and the nerves of white leather.

No. XI.

EXPANDING CENTRE-BIT.

The SILVER ISIS MEDAL and TWO POUNDS were presented to Mr. J. FRANKLIN, of No. 91 Goswell Road, for his Expanding Centre-Bit.

THIS invention consists simply of two arms, A and B, working close to each other, and connected together